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P. nympha on the Japanese island Tsu-sima, in the Straits of Corea, as well as in Borneo; the species being for the most part natives of the Eastern Archipelago, but extending into India, Ceylon and China, the Philippine and Papuan Islands, to New Guinea and northern Australia.

As the author states in his Preface, the present is an entirely new Monograph of the Pittidæ, the text of the earlier Monograph having been discarded and that of the present written "as if the subject had only now for the first time engaged my [his] attention." A few of the plates of the first edition have been retained, but the majority are from new drawings by Mr. W. Hart of London, who has most skilfully executed his task. The Pittas constitute one of the most beautiful families of birds, their striking and yet pleasing display of colors rendering them a most attractive subject for the monographer. "It is not often," says our author, "that one returns to his first love and finds her, after many years, more beautiful than ever," as has been his experience in the present instance.—J. A. A.

The Fossil Birds of Patagonia.¹—It may be a little late to notice Dr. Ameghino's memoir, but as the work has not been reviewed in 'The Auk,' and as some of the birds described therein are truly extraordinary, it is perhaps a case of better late than never; moreover, there are one or two points concerning these birds and Dr. Lydekker's notice of them² that deserve at least a passing notice. In this memoir Dr. Ameghino describes the remains of thirty-two species of birds from the Eocene of Patagonia, fifteen of which, as well as nine genera and one family, are new. The main interest of the paper, however, centers about the gigantic forms for whose reception the order Stereornithes was established by Moreno and Mercerat in 1891. These authors have distributed in four families the various genera placed by Dr. Ameghino in the family Phororhacidae, although this grouping must be largely a matter of opinion, since the parts most necessary for a family diagnosis are lacking. Not all the species of the family are large, but the leading members of the group, *Phororhacos* and *Brontornis*, were birds of great size, rivalling in bulk the *Æpyornis* of Madagascar and the Moas of New Zealand, while they were, like them, flightless. The reduction of the wing had not, however, proceeded so far as in the last named birds. A remarkable feature of the genus *Phororhacos* is the great size of the skull, which in *P. inflatus* is 13 inches long and 5½ inches across the articular portion, while the mandible of *P. longissimus* is 21 inches in length and 8 inches across the condyles. Small wonder that the symphysis of such a jaw,

¹ Florentino Ameghino | Sur les | Oiseaux Fossiles | de Patagonie | Extrait du Boletín del Instituto Geográfico Argentino | tome XV, cahiers 11 et 12 | Buenos Ayres | 1895.

² Knowledge, London, June, 1895.

found in 1887, should have been ascribed to some sluggish edentate, so that the name as it now stands was originally intended for a mammal. This size is the more noteworthy when we consider that in most feathered giants, *Gastornis* is an exception, the skull is comparatively small, that of the Moas being so absurdly diminutive for the big body and massive legs as to seem like a caricature. A cervical vertebra of the larger species, *P. longissimus*, measures 5 inches across, and the tarsus of the smaller is nearly 18 inches long, indicating a bird not far from six feet high. *Brontornis* seems to have held much the same position among the Stereornithes that *Dinornis elephantopus* did among the Moas, being low and massive, as may be judged by the tarsus, which is $16\frac{1}{2}$ inches long and $5\frac{1}{4}$ wide at either end. *Pelycornis* was a smaller, more lightly built species than those just mentioned, but, taking the beak as a criterion, it is closely related to *Phororhacos*.

What may be the affinities of these big Stereornithes is a question of much interest, but it is one whose answer is still afar off, not only because such important parts as the sternum and palatal region are unknown, but because many intermediate links are needed to unite these extinct forms with any living birds. Dr. Ameghino lays great stress on the fact that there is no separation between the orbital and preorbital cavities, and that the lachrymal sends a thin process downwards and backwards from its inner edge to unite with the pterygoids (?). The first character is one of small importance since other birds, Gallinæ for example, have practically no bar of bone intervening between the orbit and the nasal, there being but one opening between it and squamosal. The other character seems important, but little can be said concerning it without having seen the skull itself, the more that one or two reference letters cannot be made out. One can but think that through some defect of the specimen the lachrymal and ethmoid have been misinterpreted, since it is ordinarily the lachrymal, and not the ethmoid, which is closely applied to the descending process of the nasal. Dr. Lydekker speaks of certain resemblances between the beaks of *Phororhacos* and those of the Cathartidæ, but the writer fails to see the least similarity between the two. Also, by a slip of the pen, the upward curve of the lower mandible is said to be found only in the Trumpeter, *Psophia*, among existing birds, whereas *Psophia* has no, or but the slightest, upturning of the mandible while numerous other birds have this feature. The abortion of the distal part of the pubis is unique, although there is a bare possibility that, as in some existing birds of prey, the posterior part of the pubis was present, but free, and attached to the ischium by ligament. Dr. Lydekker makes many comparisons with the Ratitæ, but, as Dr. Ameghino justly says, the Stereornithes appear to show that the division of the class of birds into Ratitæ and Carinatæ is not fundamental, a point wherein most American ornithologists will agree with him. Apparently the main reasons for comparing such forms as *Phororhacos* and *Brontornis* with the Struthionines is because they are large and extinct when, as a matter of fact, mere

size is no reason for supposing a bird related to an Ostrich, while the pelvis of *Phororhacos*, with its aborted pubis, shows that this genus at least is very many removes from any struthious bird. Neither is *Gastornis*, with its primitive type of skull, any relation of the Stereornithes.

The well-developed supra-orbital bone of *Phororhacos* is particularly a mark of South American forms, but as it occurs in such different birds as *Psophia* and some of the Tinamous, it gives no clue to probable relationship, and until the sternum and palate come to light the Stereornithes must remain largely unclassified, although we have some hints as to their affinities and more as to their habits. The skull tells us that the Phororacidae at least captured living creatures, for the upturned lower mandible occurs among the Herons, and is extremely well-marked in the Kingfishers. Correlated with the beak is the squareness of the hind cranium and the prominence of all the ridges, these things, which have to do with seizing and holding, being found in very dissimilar forms of similar predaceous habits. Birds of prey, which grasp with their talons, have the beak modified for tearing and possess a weak decurved lower jaw. The coracoid has little resemblance to the unique coracoid of *Psophia*, but the bones of the shoulder girdle, particularly the scapula, are very like those of a Heron, while the metacarpus much resembles that of *Palamedea*, minus the spurs. The pelvis, in its straightness and squareness, has certain agreements with that of *Palamedea* and the Herons, and still more with that of *Psophia*, though differing from them most emphatically in the abortion of the pubis. The main facts, however, shown by pelvis and legs, indicate that these birds were runners, though the hypotarsus indicates very plainly that there is no relationship with birds of high degree. That *Phororhacos* and its allies should have resemblances to more than one group of birds is not surprising, not only from their geographical distribution and geological horizon, but because although specialized in details they were generalized in many points of structure. The Phororacidae at least seem distantly related to *Psophia* and not much more distantly to the Herons, and we may recall that we have one aberrant relative of the Herons alive to-day in the shape of the curious African *Balaeniceps*. That the Stereornithes have any *near* living relatives is not evident and it is much easier to say where their affinities do not lie than where they do, but that such strange forms should have been found in South America seems quite natural, and others just as strange will undoubtedly come to light. We have in such birds as *Chauna*, *Steatornis*, *Psophia* and *Cariama* the waifs and strays of a lost avifauna left by the sea of time stranded on the shores of the present, and the more we delve in the sands of the past, the more of these quaint forms will we bring to light. And we cannot better close than by wishing it may be given to Senor Ameghino to find these missing pieces and fit them in their proper places.—F. A. L.